

2 minute Warm-up!

1. $\log_4 16 = 2$

2. $\log_4 64 = 3$

3. $\log_3 9 = 2$

4. $\log_3 \frac{1}{3} = -1$

5. $\log_2 32 = 5$

6. $\log_2 4 = 2$

7. $\log_5 \frac{1}{25} = -2$

8. $6^{\log_6 32} = 32$

9. $\log_4 x < 2$
 $4^2 > x$
 $0 < x < 16$

10. $\log_2 x > 3$
 $2^3 < x$
 $x > 8$

10-3
Properties of Logs

$$b > 0 \quad b \neq 1$$
$$m > 0 \quad n > 0$$

1. $\log_b m \cdot n = \log_b m + \log_b n$

2. $\log_b m/n = \log_b m - \log_b n$

3. $\log_b m^p = p \cdot \log_b m$

Simplify.

ex

$$2\log_{10} 5 + \log_{10} 4$$
$$\log_{10} 5^2 + \log_{10} 4$$
$$\log_{10} 100$$
$$2$$

ex

$$2\log_3 6 - \log_3 4$$

$$\begin{aligned} \log_3 6^2 - \log_3 4 \\ \log_3 \frac{36}{4} \\ \log_3 9 = 2 \end{aligned}$$

ex

$$\log_4 40 - \log_4 5$$

$$\begin{aligned} \log_4 8 &= y \\ 4^y &= 8 \\ 2^{2y} &= 2^3 \end{aligned} \quad \left(\frac{3}{2} \right)$$

ex

$$\log_4 3 - \log_4 48$$

$$\log_4 \frac{1}{16} = -2$$

ex Expand

$$\log_6 m^2 n^3$$

$$\begin{aligned} \log_6 m^2 + \log_6 n^3 \\ 2\log_6 m + 3\log_6 n \end{aligned}$$

Expand
ex

$$\log_4 \sqrt{\frac{m}{n^5}}$$

$$\frac{1}{2} \log_4 \frac{m}{n^5}$$

$$\frac{1}{2} (\log_4 m - 5 \log_4 n)$$

Solve.

ex

$$\log_5 x = 3 \log_5 2 + \log_5 7$$

$$\log_5 x = \log_5 2^3 \cdot 7$$

$$\log_5 x = \log_5 56$$

$$x = 56$$

Solve.

ex

$$\log_3 x = 2 \log_3 3 + \log_3 5$$

$$x = 45$$

Solve.

ex

$$\log_b(x+3) = \log_b 8 - \log_b 2$$

$$\log_b(x+3) = \log_b 4$$

$$x+3=4$$

$$x=1$$

Solve.

ex

$$\log_7(x+1) + \log_7(x-5) = 1$$

$$\log_7(x+1)(x-5) = 1$$

$$\log_7(x^2 - 4x - 5) = 1$$

$$7^1 = x^2 - 4x - 5$$

$$0 = x^2 - 4x - 12$$

$$(x-6)(x+2)$$

$$x=6 \quad x=-2$$

Given:

$$\log_3 7 \approx 1.7712$$

$$\log_3 2 \approx 0.6310$$

$$\log_3 3^p = p$$

ex

$$\log_3 54$$

$$\log_3 3^3 \cdot 2$$

$$\log_3 3^3 + \log_3 2$$

$$3 + .6310 \approx 3.6310$$

ex

$$\log_3 .25$$

$$\log_3 \frac{1}{4} =$$

$$\log_3 2^{-2} = -2 \log_3 2$$

$$-2(.6310)$$

$$-1.2620$$

Given:

$$\log_3 7 \approx 1.7712$$

$$\log_3 2 \approx 0.6310$$

$$\log_3 3^p = p$$

ex

$$\log_3 9/49$$

$$\log_3 \frac{3^2}{7^2}$$

$$\log_3 3^2 - \log_3 7^2$$

$$2 - 2(1.7712) \approx -1.5424$$

Given:

$$\log_3 7 \approx 1.7712$$

$$\log_3 2 \approx 0.6310$$

$$\log_3 3^p = p$$

HW
p544-545
13-33odd